

What is claimed is:

[Claim 1] 1. A system for generating hydrogen fuel for a fuel cell, said system comprising:

a reforming process device for implementing a reforming process that converts primary fuel into hydrogen; and

a membrane (10) having selective permeability for CO₂, said membrane (10) being essentially composed of ceramic material.

[Claim 2] 2. The system as recited in claim 1, wherein a primary side of the membrane (10) faces a first chamber (8a), said first chamber (8a) being configured as a reaction chamber for at least a part of the reforming process.

[Claim 3] 3. The system as recited in claim 2, wherein said first chamber (8a) is configured as a reaction chamber for a reforming process which comprises converting primary fuel to hydrogen and at least one of CO and CO₂.

[Claim 4] 4. The system as recited in claim 2, wherein said primary side of the membrane (10) is at least partially coated with a layer of reformer catalyst (9).

[Claim 5] 5. The system as recited in claim 3, wherein said system is arranged to principally supply primary fuel, water and air to the first chamber (8a), and wherein the supply of air is separately arranged so that the proportion of air in the first chamber (8a) is variable.

[Claim 6] 6. The system as recited in claim 2, wherein a secondary side of the membrane (10) faces a second chamber (8b), and through said second chamber a flow of flushing gas passes.

[Claim 7] 7. The system as recited in claim 6, wherein said flushing gas has a water content approximately corresponding to a water content in the first chamber (8a).

[Claim 8] 8. The system as recited in claim 6, wherein said flow of flushing gas passes along said membrane (10) in an essentially opposite direction to a main direction of flow in the first chamber (8a).

[Claim 9] 9. The system as recited in claim 2, further comprising:

at least one heat exchanger (5) arranged to transfer heat between at least one flow (2, 4) leaving one of the chambers (8 A, 8b) and at least another flow (1, 3) entering one of the chambers (8a, 8b).

[Claim 10] 10. The system as recited in claim 2, further comprising:

a second membrane (22) exhibiting selective permeability for CO, said second membrane (22) being arranged to separate CO from a flow of hydrogen fuel (2) leaving the reforming process device.

[Claim 11] 11. The system as recited in claim 10, wherein said second membrane (22) is essentially composed of ceramic material.

[Claim 12] 12. The system as recited in claim 10, wherein said primary side of the second membrane (22) faces a first channel (21) through which the flow of hydrogen fuel (2) pass, and wherein said secondary side (25) of the second membrane (22) is at least partially coated with a layer of oxidation catalyst (23).

[Claim 13] 13. The system as recited in claim 12, wherein said secondary side (25) of the second membrane (22) faces a second channel (24) through which a flow of oxygen-containing flushing gas passes in a direction essentially opposite to a main direction of flow in the first channel (21).

[Claim 14] 14. The system as recited in claim 6, wherein said gas flow in said second channel (24) comprises a flow (3) entering the second chamber (8b).

[Claim 15] 15. The system as recited in claim 10, wherein said second membrane (22) exhibits selective permeability for CO₂.

[Claim 16] 16. The system as recited in claim 1, further comprising:
at least one of the first and second membranes (10,22) having a microporous structure.

[Claim 17] 17. The system as recited in claim 16, wherein said at least one of the first and second membranes (10, 22) has one of a zeolite and a zeolite-like structure.

[Claim 18] 18. The system as recited in claim 1, wherein said system is arranged in a mobile application.

[Claim 19] 19. A system for generating hydrogen fuel for a fuel cell, said system comprising:

a reforming process device for implementing a reforming process that converts primary fuel to hydrogen; and

at least one cleaning device that cleans a flow of hydrogen fuel leaving the reforming process; and

said cleaning device comprising a membrane (22) having selective permeability for CO, and said membrane (22) being essentially composed of ceramic material.

[Claim 20] 20. The system as recited in claim 19, further comprising:

a primary side of the membrane (22) facing a first channel (21) through which the flow of hydrogen fuel passes; and

a secondary side (25) of the membrane is at least partially coated with a layer of oxidation catalyst (23).

[Claim 21] 21. The system as recited in claim 19, wherein said secondary side (25) of said membrane (22) faces a second channel (24) through which a flow of an oxygen-containing flushing gas is arranged to pass.

[Claim 22] 22. The system as recited in claim 21, wherein said flow of flushing gas is arranged to pass in a direction essentially opposite to a main direction of flow in said first chamber (21).

[Claim 23] 23. The system as recited in claim 19, wherein said membrane (22) has selective permeability for CO₂.

[Claim 24] 24. The system as recited in claim 19, wherein said membrane (22) is composed of a microporous structure.

[Claim 25] 25. The system as recited in claim 19, wherein said membrane (22) exhibits a zeolite structure.

[Claim 26] 26. The system as recited in claim 19, wherein said system is arranged in a mobile application.

[Claim 27] 27. The system as recited in claim 19, wherein said membrane (22) exhibits a zeolite-like structure.

[Claim 28] 28. The system as recited in claim 6, wherein said flushing gas is air.

[Claim 29] 29. The system as recited in claim 21, wherein said flushing gas is air.